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SYMPATHETIC NERVOUS ACTIVITY IN THE EYE*

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An investigation of the relationship of the sympathetic nervous system to the eyes resulted in the collection of a certain amount of data which may prove helpful to others interested in the same question. The following essay sets forth the information so obtained.

The sympathetic (visceral or vegetative) nervous system is derived from the neural plates (embryological), cells from which move forward in development, forming interconnected chains of spinal ganglia on either side of the vertebral column. A group of cells from the ventral margins of the plates migrate toward the aorta where some become the ganglia of the sympathetic trunks, while others continue and form the prevertebral and visceral plexuses. Cells from a localized part of the neural crest give rise to the semilunar ganglion as well as the smaller ganglia found on the branches of the trigeminal nerve; the *sphenopalatine*, otic, submaxillary, and *ciliary*.

Motor fibres involved in the control of the ciliary muscle and the sphincter pupillae arise in the nucleus of the oculomotor nerve which lies imbedded in the floor of the cerebral aqueduct and projects forward into the floor of the third ventricle. The nucleus is composed of a number of component nuclei, and of these the large median nucleus is the point of origin of the preganglionic fibres which make synaptic connections in the ciliary ganglion with postganglionic (sympathetic) fibres controlling the ciliary muscle. The sphincter of the iris is controlled by postganglionic fibres which form synaptic connections in the same ganglion with preganglionic fibres from the paired accessory or Edinger-Westphal nuclei, situated more anteriorly than the median nucleus in the inclusive nucleus of the oculomotor nerve. The fibres arising from these three component nuclei of the oculomotor nucleus enter the orbit in the oculomotor nerve and separate from the largest of the three branches of the inferior ramus to form the short root of the *ciliary ganglion*. Here they form synaptic connections with the postganglionic fibres that communicate with the ciliary muscle and the sphincter pupillae via the short ciliary nerves.

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The motor fibres which supply the dilator of the iris arise at an indeterminate point in the mid brain and run downward in the spinal cord to the level of the eighth cervical, first and second thoracic vertebrae where they leave the cord in the anterior roots of the corresponding spinal nerves. They enter the spinal trunk from the white rami communicantes, terminating in the *superior cervical ganglion*. Postganglionic fibres (sympathetic), with which synaptic connections are formed in the ganglion, pass *through* the semilunar ganglion and along the ophthalmic division of the Trigeminal nerve to the orbit, thence through the long ciliary nerves to the dilator pupillae. These fibres are in a *continuously tonic state*, while those controlling the ciliary muscle and sphincter pupillae are not. The tonic state is demonstrated by the contraction of the pupil immediately following section of the cervical sympathetic trunk in laboratory animals. In addition enophthalmos, and the closure of the nictitating membrane in animals possessing one, have been observed. This would indicate that the tonus maintained in the sphincter pupillae by the cervical sympathetic determines the size of the pupil and that the position of the eye in the orbit is largely under sympathetic control. Enophthalmos in humans is regarded as a sympathetic disease and usually follows trauma or pathology affecting the pre or postganglionic fibres in this group. It may also occur in diseases of the orbital tissues and from loss of fat from other causes. The tonic state is due to an efferent discharge from the cells in the mild brain whence the preganglionic fibres to the superior cervical ganglion come, and inhibition or excitation of this center will cause changes in the pupillary size. Changes in the tonic state may also be brought about by inhibition of this center with a coincident discharge through the ciliary ganglion to the sphincter pupillae.

Pupillary constriction accompanying accommodation is variously regarded as a reflex and as an associated movement. It is believed that activity of either the medial nucleus or the paired Edinger-Westphal nuclei will affect the other because of their proximity in the oculomotor nucleus. This may also explain the accommodation-convergence relationship, as the motor fibres controlling the internal recti arise from the paired principal nuclei which lie in the nucleus of the oculomotor nerve just posterior and a little lateral to the Edinger-Westphal nuclei. Simultaneous activity of these centers controlling respectively the pupillary size, the accommodation, and convergence, sets the stage for the formation of conditioned reflexes and, although the functions may be initiated first by spreading of neural activity from one component nucleus to another, simultaneous repetition of the three acts over even a comparatively short length of time would result in conditioning such that stimulation of any one of the three neural mechanisms would call for reflex activity of the others. The modifications that these functions undergo in various forms of muscular and fusional training indicates that conditioned reflexes are considerably involved in the three related functions.

Vasomoter activity in the eye, as well as elsewhere in the body, is under the control of the sympathetic. The vasoconstrictor fibres supply-

ing the eye arise from the spinal cord as preganglionic fibres and emerge in thoracic region as do those having to do with the dilators of the iris, and like them follow a similar course over the white rami to the chain of sympathetic spinal ganglia. They undergo synaptic connections in the superior cervical ganglion with the postganglionic fibres which innervate the smooth musculature of the ocular and orbital vessels. The vasodilators arise partly from the cervical sympathetic and partly from the sympathetic fibres of the facial nerve. Preganglionic fibres arising from the nucleus of this nerve reach the *sphenopalatine ganglion* by way of the great superficial petrosal nerve. In this ganglion they form synapses with postganglionic (sympathetic) fibres which transmit vasodilator impulses to the orbital glands. The sphenopalatine ganglion has communications with the ciliary ganglion and this is connected with the nasociliary branch of the trigeminal nerve.

An interesting parallel exists between the ciliary and pupillary functions on one hand, and vasodilation and constriction on the other. Just as the fibres from the cervical sympathetic to the dilator pupillae are in a constantly tonic state, so too are the vasoconstrictor fibres similarly in a constantly stimulated condition, and the vasodilator fibres, like the fibres supplying the sphincter pupillae and ciliary muscle, are free from tonic activity.

With the extensive connections existing between the sympathetic nervous mechanisms in the eye and those elsewhere in the body the possibility of an infinite number of conditioned reflexes is evident. The possibility of interaction through sympathetic connections in the various ganglia implies the likelihood of many combinations of functional influences on tissues supplied by the sympathetic in other parts, but more particularly those receiving sympathetic innervation through the cervical sympathetic and the sympathetic fibres of the facial and trigeminal nerves. For example, gastro-intestinal dysfunction as a concomitant of eye trouble may be caused by impulses originating in the eye and its connections being transferred through the sympathetic trunks to the smooth musculature of the G. I. tract. Referred pain involving sympathetic stimulation is not uncommon.

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THE DUAL ROLE OF THE IRIS*

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Some philosopher has said that it would be more adequate to say, "*Not* seeing is believing," since after seeing we feel that we know and we no longer have to resort to belief. Be that as it may we are more of natural scientists than philosophers and in our work truly seeing is believing. When we see ever so often low-power corrections giving ocular relief out of proportion to the apparent defect we must believe in the efficiency of the prescription. And yet how can a trifling dioptric value of a quarter or even a half so deplete the nervous system of an otherwise healthy individual as to cause such marked symptoms of eye strain? Or is the relief purely a psychic effect removing a discomfort which in its turn likewise had no physical basis?

Eye strain from whatever source can certainly be ameliorated or increased by mental states. The psychic element is an undeniable component in all human ailments and psycho-therapy is as important in treating human eyes as it is in treating any other part of the body. But psychic eye strain, visual discomfort resulting purely from mental states, is much rarer than one might be led to believe from the number of successful low-power corrections.

Thoughtful observers recognizing that in the vast majority of cases the latter must have a physical and physiological basis for their evident efficiency have cast about for any explanation. Analyzing the different elements of the ocular mechanism which participate in the act of vision the role of the iris was seen to have been underestimated. And it was Charles F. Prentice, the father of Legalized Optometry and by *far* the greatest scientist optometry has yet produced who first presented a logical exposition of the role which the iris plays in this problem. In a paper first published in the Annals of Ophthalmology and Otology, October, 1895, Mr. Prentice analyzed the dual role of the iris. In the first place the iris acts as a diaphragm, similar to that found in other compound optical systems, the purpose of which is to lessen the amount of spherical aberration. In the second place the iris acts as a photostat, that is, a mechanism for regulating the amount of light entering the eye.

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Mr. Prentice proceeds to show how imperfert functioning of the iris apart from any error of refraction may be the cause both of impaired vision and of asthenopia. For instance with regard to blurred vision he says, "It is questionable whether the eye can discriminate between images which are impaired by peripheral aberration and those which are illy defined through slight errors of refraction." With regards to asthenopia he says, "Asthenopia is therefore quite as apt to be experienced on account of the size of the pupil as it is on account of the error of refraction."

Now the thesis that low power corrections improve vision and remove eye-strain largely because of their effect on the iris offers the first logical explanation of an observed fact. But it does not cover the entire ground as subsequent studies have shown. The role of undue light intensities, of unsubdued sources of illumination, is intimately bound up with this problem and must be included in evaluating this work. It is true as Mr. Prentice says that patients "with large pupils and small errors of refraction are afflicted with asthenopia," but the cause of the affliction is usually not limited to the unconscious effort on the part of the iris to lessen the aberration. There are several causes and one of these unquestionably is in many cases the cumulative nervous shock incident to a slight but continuous excess retinal stimulation. In fact it is this latter, slight but steady grind, which is apt to be most wearing upon the eyes. The efficiency of the low power lenses then consists not only in helping the iris in its double function of diaphragm and photostat, but also in tending to shield the retina from overstimulation. For even plain white glass eliminates some of the incident light and thereby subdues, to some extent at least, the volume of light before it strikes the retina.

Mr. Prentice's major premise is that it is through the relief of peripheral aberration that low power corrections accomplish their beneficent work. And yet while developing this premise he cannot help but touch upon the effect of light intensities and light sensitiveness. Frequently though unobtrusively, these references come in, e.g., peripheral aberration "also aggravates *photophobia* which is a symptom frequently complained of in such cases," or in one of the concluding passages where he says, "So far we have no means of ascertaining the size of that variation of pupil which is necessary to establish the proper harmony between refraction, accommodation, illumination, and freedom from aberration."

Eyes with large pupils more than any others need some protection, some softening of the light before it reaches the retina. But the terms large and small with reference to the pupil can only have a meaning relative to the surrounding light sources. A 3 mm. pupil is relatively enormous when it is exposed to a dazzling automobile headlight. Considering our present day sources of illumination both indoors and outdoors we find that many eyes with low or high errors of refraction present *relatively* large pupils and need some light protection. Ordinary plain glass affords some of this protection, but the full effect is best obtained from any of the varieties of glass which are especially designed

for this purpose. Care must be exercised, however, that the glass used should not exclude any of the vital elements of natural light. The glass should subdue and soften the volume of incident light but not alter its relative composition.

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LATENT EXOPHORIA
and
THE REDUCTION OF OCULAR REFRACTION
With Special Reference to Tetanus of Ciliary and Recti Muscles*
Part III.

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(Continued from the October issue)

We find that nerve anatomy has kept even pace with other ocular, orbital and facial changes. As before stated, the visual centers in the brain have greatly enlarged in proportion with other areas. A very important factor is the change which has come about in the third nuclei. In lower forms of life where the eyes operate independently of one another, the two third nuclei appear to be entirely separated. As the eyes came forw rd and the visual fields began to overlap, some associated action between the two third nuclei became advisable, and so we find an increasing exchange of fibers running between them until they become practically fused into one nucleus in man. Fig. 16 and Fig. 17, which represent the work of Dr. Tilney along this line, illustrate the point.

There was also created a central group of cells having to do with convergence which is absent in rodents and presumably in lower forms of life.

Striking changes have occurred in the optic nerves also. In low forms the nerves remain on the same side as the eye and connect with the brain on the same side. Higher up in the scale—Cajal believes it to have occurred in the fish—the optic nerves entirely cross, or decussate, thus harmonizing in the brain the position of objects in space as seen by the two eyes.

This radical change, to quote from Tilney and Riley, "exerted a decisive influence upon other pathways in the nervous system, consequent upon the reversal of the mental image in the brain. This reversal of the mental image necessitated a compensatory crossing of other tracts, especially in the motor pathway. Such compensatory motor decussation in turn determined a crossing of the sensory tracts. In this manner the character of the vertebrate eye, which in the first instance enforced the complete crossing of the optic fibers, ultimately determined all decussations within the central nervous system."

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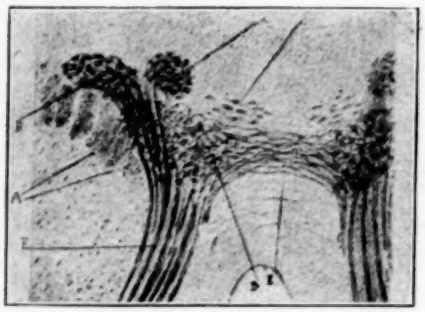

Figure 16. Microphotograph of the third nuclei. The interchange of fibers is plainly visible. (Tilney and Riley. Form and Function of the Central Nervous System.) Frontal section of the midbrain at the level of the oculomotor nucleus; human fetus of 7 weeks. Silver nitrate reduction. (Cajal.)

A—Posterior longitudinal fasciculus. B—Lateral cellular group of the oculomotor nucleus. C—Superior cellular group of the oculomotor nucleus. D—Ventral or principal cellular group of the oculomotor nucleus. E—Transverse commissure formed by the decussating fibers coming from the principal cellular group. F—Roots of the oculomotor nucleus.

Longitudinal Co-efficient of Oculo-motor Decussation in

Lower Primates (Lemuroid)		Intermediate Primates (Simian)		Higher Primates (Anthropoid)	
Lemur	.160			Orang-Outang	.710
Tarsier		Gibbon	.660	Chimpanzee	.860
Marmoset	.380	Macacus	.710	Gorilla	.880
Mycetes (howler monkey)	.690	Baboon	.790		

Fig. 17. Table of third nuclei co-efficients.
(Tilney. The Brain from Ape to Man)

Later, as the visual fields began to overlap, those optic nerve fibers connected with the areas participating in this overlapping began to split off from the optic nerve at the chiasm and remain on the same side. They are few in the rabbit, more in the cat (which has some converging power) and most in man, in whom they constitute about one-fourth of the total. (Duke Elder, page No. 330.)

For practical purposes, man's fields exactly coincide and this arrangement of his visual nerve fibers permits fusion of the two images in the brain and the achievement of stereopsis as the crowning result.

Concurrent with these changes there occurred in man and the anthropoid apes a localized area of high sensitivity in the retina—the fovea—which gives him exceptionally keen vision. The presence of two such highly differentiated areas—one in each eye—necessitated a more or less rigid association of the two eyes together and must have greatly stimulated the stereoscopic sense, resulting in an enormous leap forward of human intellect. For the ability to perceive depth, together with the development of the human hand to utilize this sense, has unquestionably had more to do with the growth of man's brain and mind than any other factors, perhaps more than all other factors combined. Certainly

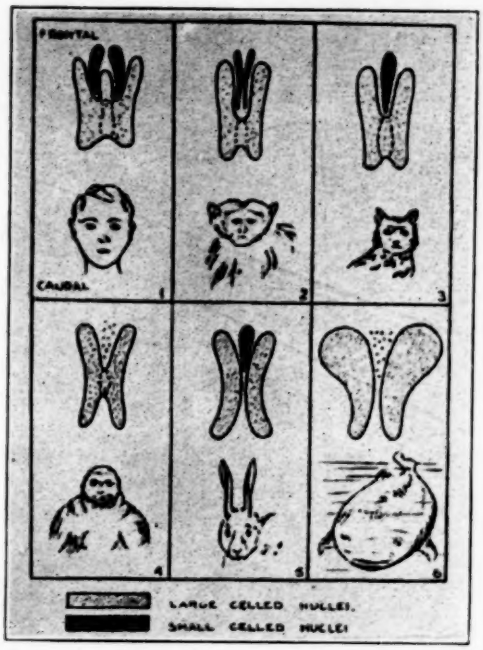

Figure 18. Schematic representation of phylogenetical deevlopment of the third nucleus. (Duke-Elder. Recent Advances in Ophthalmology.)

1. Homo
2. Aretopitheci
3. Carnivora
4. Pinnipedia
5. Rodentia
6. Cetacea

The large-celled lateral nuclei are quite separate from each other in animals with laterally-directed eyes. As the eyes migrate to the front and binocular vision develops, the two groups fuse, the area of fusion becoming of greater importance, until it is most highly developed, with a forward prolongation, in man. (From Brouwer, Zeitschr. f. d. g. Neurol. u. Psychiatr., 1918.)

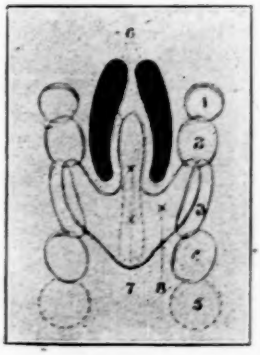

Figure 19. Diagrammatic scheme of the third nucleus.

1. Levator palpebrae.
2. Superior rectus.
3. Inferior oblique.
4. Inferior rectus.
5. Superior oblique: Nerve IV.
6. Internal ocular muscles (sphincter of iris and ciliary muscle).
7. Internal rectus: convergence.
8. Internal rectus: inward movement.

(Duke-Elder. Recent Advances in Ophthalmology.)

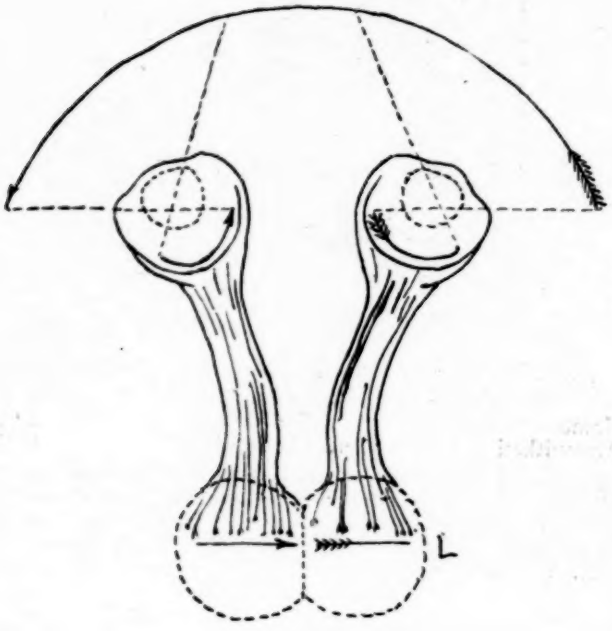

Figure 20. Diagram showing the disharmony of the mental image of an object in lower vertebrates without an optic chiasm. (Tilney and Riley [after Cajal]. Form and Functions of the Central Nervous System.)

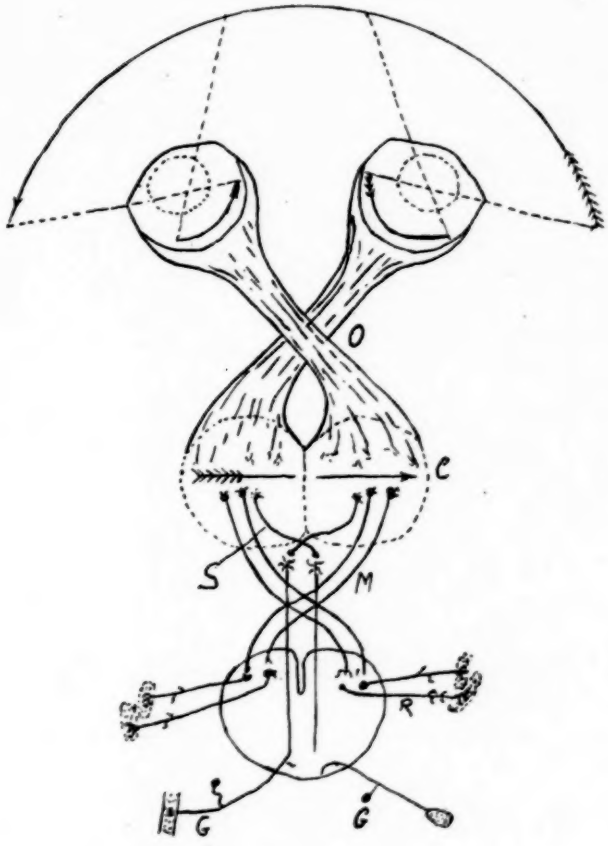

Figure 21. Diagram showing the usefulness of the optic chiasm and the compensatory decussations of the motor and sensory tracts in the lower vertebrates. (Cajal.) C—Seconary visual centers, showing incompleteness of each field. G—Spinal ganglia and sensory roots. M—Crossed motor tract. O—Crossed optic nerves. R—Motor roots of the spinal cord. S—Central termination of the crossed sensory tract. (Tilney and Riley. Form and Function of Central Nervous System.)

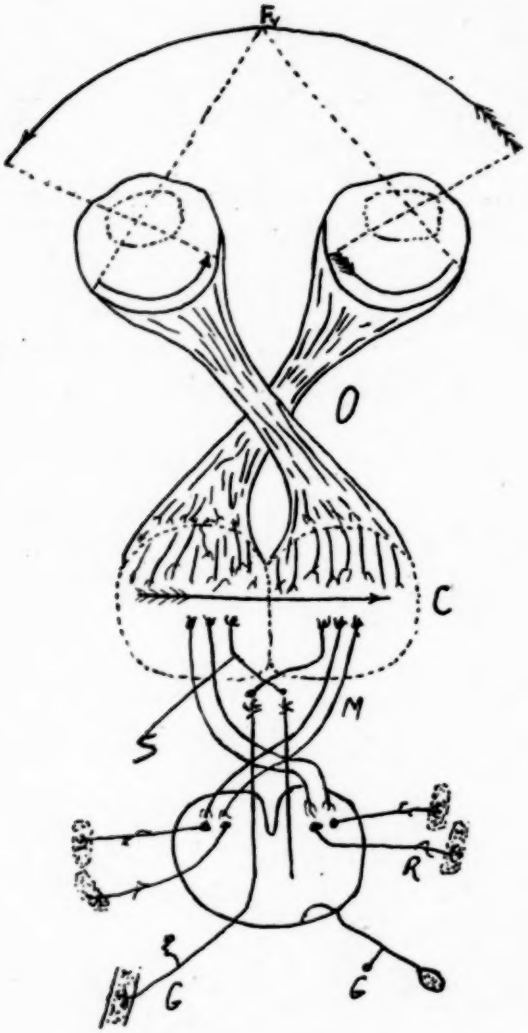

Figure 22. Diagram showing complete fields. C shows the completeness of the fields and Fv shows the common point of meeting of the temporal extremity of each visual field. (Tilney and Riley. Form and Functions of Central Nervous System.)

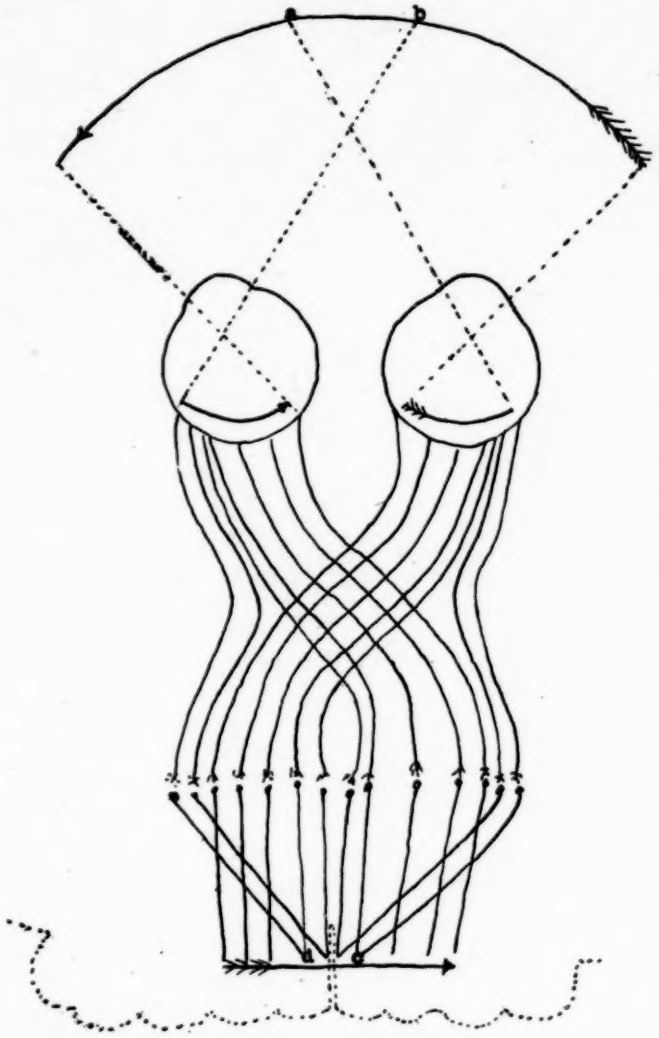

Figure 23. Diagram showing a partial overlapping of the visual fields which necessitated a rearrangement of the decussating nerve fibers. Stereopsis was limited to the area restricted by the extent of the overlapping of the visual fields. a-b, d-c shows stereoscopic area in the visual cortex. (Tilney and Riley. Form and Function of Central Nervous System.)

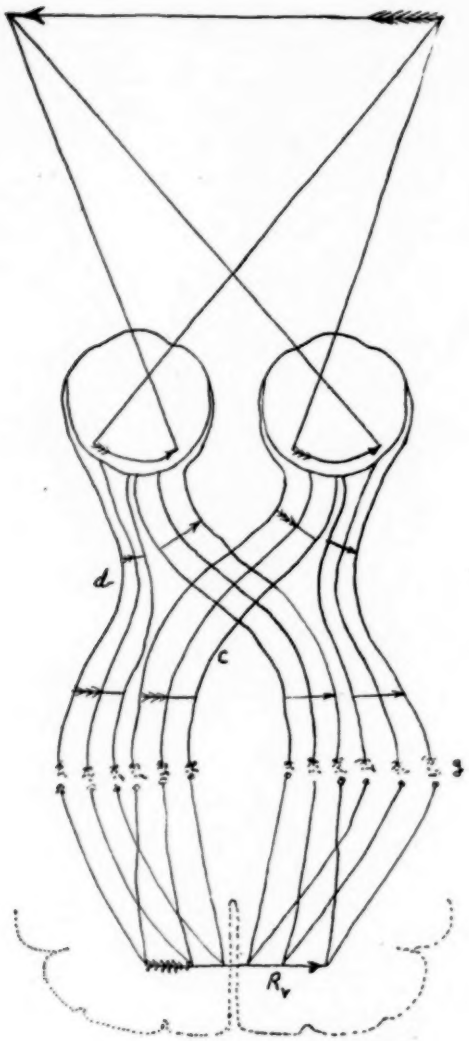

Figure 24. Diagram of the chiasm of the optic tracts and the central projection in man (Cajal). C—Crossed fasciculus of the optic nerve. D—External geniculate body. Rv—Projection of the mental image in the visual cortex of the brain. (Tilney and Riley. Form and Function of Central Nervous System.)

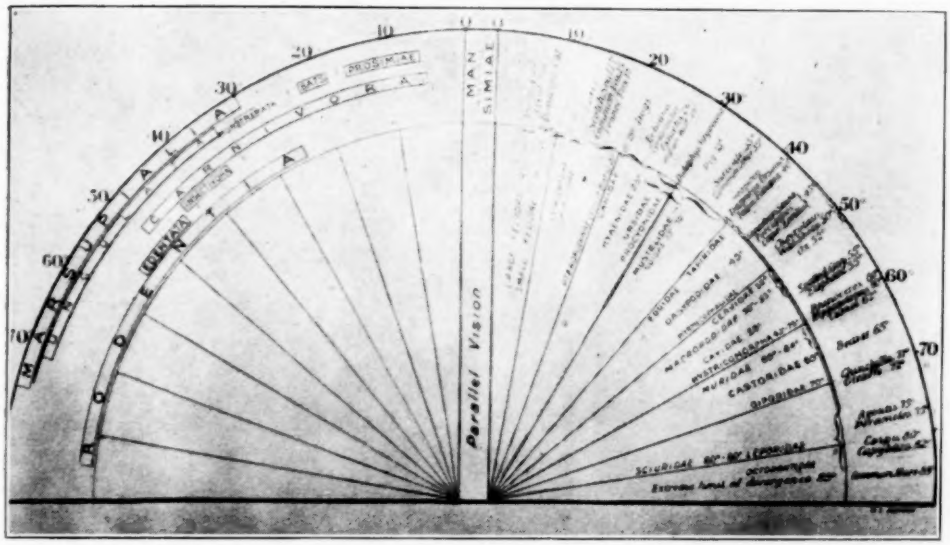

Figure 25. Visual axes in mammals as diagrammed by Lindsley Johnson.

it was not simple visual acuity nor the senses of smell, hearing, taste or touch, for all of these are much more highly developed in other forms of life but without commensurate intellectual growth.

From the foregoing it appears quite natural to conclude that Nature's ultimate purpose in bringing the visual axes forward was to accomplish a fusion of the field of the two eyes so that stereoscopic vision might result. She changed not only the structure of the visual apparatus but a large portion of the head and of the entire nervous system. It must be assumed, then, that the stereoscopic function is a vital one, that is, vital to man as man—as a distinct species of animal. Without it he would cease to be man—he would revert to a lower type. Consequently, he must, individually and collectively, maintain stereoscopic vision at any cost. And the cost sometimes runs very high.

For, as was mentioned in the beginning, all men are not created equal in all ways. Some hear better than others, some see better, there are great differences in sensitiveness of all kinds. In intellectual development, presumably the latest acquisition of man's nervous system, there are enormous differences.

In our own field we note great differences, as in the refraction of the eyes. The ideal is an eye so constructed that it will focus parallel rays of light on the retina without effort. We know that it is an ideal almost never achieved.

Why, then, should we be justified in assuming that the rotating mechanism of the eyes is perfect, especially since it is a far more recent acquisition than the focusing apparatus which is highly developed in animals far more remote than the fish?

We are not justified in such an assumption. The fusion of the two fields, resulting in stereopsis, is the "baby" in visual apparatus development, and it often possesses the incompleteness of infancy.

In other words, the movement of the visual axes from the side to the front so that they are parallel and at rest is incomplete in a great many individuals—perhaps in at least 35 per cent. Were these individuals living under primitive conditions, so that close applicaton of the eyes was seldom necessary, it would not matter greatly. But often they are not. After a million years of ancestral life in the open, they suddenly have been plunged into urban life and forced to concentrate upon near work. The change was too sudden for adaptation with comfort. Consequently, they are compelled to use a great deal of energy to make up for tardiness of development of their parallelizing and converging mechanism. And to do it most effectively from the standpoint of cerebral or intellectual requirement, they must do it unconsciously by drawing upon the vital reservoir of nervous energy. Therein lies the greatest harm, for a voluntary effort produces ill effects which force discontinuance of activity of the part involved, thus enforcing rest, whereas involuntary stress produces symptoms more vague and sometimes most difficult to sense and trace. Consequently, a great deal of harm may be done before awareness occurs.

It may properly be asked, "How can involuntary reserves be drawn upon when the muscles involved are of the voluntary type, supplied by voluntary cells—the internal recti, for instance?"

That is a fair and very important question but the answer necessitates a somewhat elaborate explanation which will be made as brief as possible.

As stated in the beginning, it is assumed that life began as a single cell. Some of these cells ultimately combined into groups of greatly diverse types, each forming a different type of animal. One group ultimately culminated in man who is composed of 26 trillion cells.

The purpose of such combination probably was self protection, more easy perpetuation of species and elaboration of function which in itself was a means of self-preservation.

As some of these groups became more densely formed, bulkier and more complex, it apparently was necessary to create a means of intercommunication and interchange of products. Hence, vascular or lymphatic canals were constructed. To propel life-sustaining material through these, muscles were created, and to carry stimulating impulses to the muscles, nerves and nerve cells were invented.

It is logical to assume that the first nervous system came into being this way and that its principal, if not sole, function in the beginning

had to do with internal mechanisms and functions necessary to the maintenance of life—the proper distribution and assimilation of food and elimination of waste products.

Its muscle cells or fibers, its nerve fibers and its nerve cells are distinctive in construction and peculiar to this system. The muscle fibers are of the unstriped variety, the nerve cells are stellate and multipolar, and the nerve fibers are partially non-medullated.

Its operation in general may be termed "automatic" in that it functions somewhat rhythmically and in accordance with the requirements of the vital organs at a particular moment. It likewise functions *continuously*—sleep or lack of consciousness for ordinary reasons having slight effect upon the constancy of its action. For instance, the heart beats, the diaphragm contracts, the digestive organs function, the kidneys secrete, the blood flows equably within certain limitations, and so on, when consciousness is absent. This continuity is of immense importance, apparently, in the present connection, for part of the visual system is under control of this system of nerves which may well be termed "vital."

A further characteristic of the system which is in harmony with the above is its ability to produce a state of tetanus in some muscles which is constant until the cause is removed. As we shall see, this has a direct bearing upon the subject under discussion.

The antiquity of this system of nerves cannot logically be questioned, and we assume that it is represented in man today by the so-called "autonomic" system of nerves, sometimes called "sympathetic" or "vegetative" of "visceral," which operates the organs above mentioned.

However, it is not the only neuro-muscular system in advanced animals. Presumably, in the beginning, animals of low order were content to remain stationary and accept such food as drifted into their mouths or other organs of reception. But later, in response to a mysteriour biologic urge or gradual changes in environment, some of them were placed under the necessity of moving about in search of food, or, perhaps, mates. This required the creation of a motive structure different from the "vital." Perhaps at first there were glands or cells which had a chemo-taxic response but which later evolved into muscles. At any rate, special muscles for the purpose were eventually created. They were of the striped (voluntary) variety, their nerves were medullated and the nerve cells were unipolar and pyramidal in shape.

The effective power of these muscles was greatly increased by the creation of a supporting frame-work of shells and bones to which most of them were attached, thus raising their leverage power enormously. Hence the term "skeletal" muscles, in which category the rotary ocular muscles fall.

This enabled such animals to adjust themselves more readily to

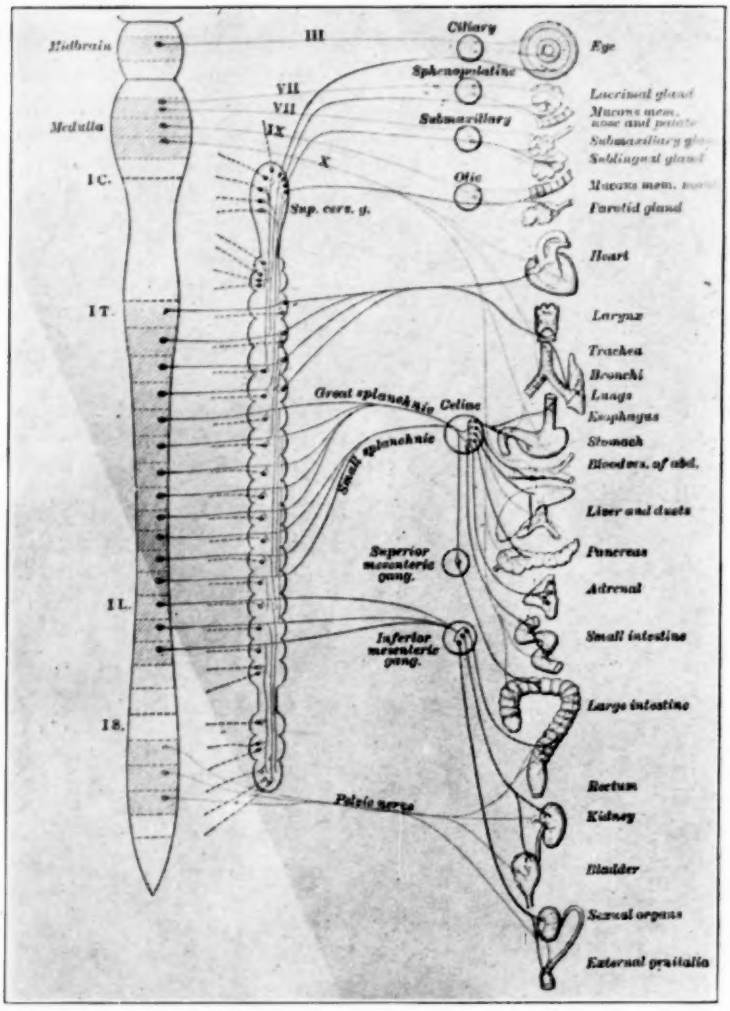

Figure 26. Diagrammatic outline of anatomic nervous system. After Meyer and Gottlieb. (Burton-Opitz. Physiology.)

their environment, pursue food more quickly and avoid danger successfully enough to insure the continued existence of the species.

Concurrently with this development there arose the power of volition, and all this system is now in man largely under the control of his will. In this way, it is quite distinct from the vital system whose operations are conducted with notable freedom from will-domination.

Notwithstanding this independence, there is, of course, a close association between the two systems. They are often mutually assistive. Especially, it appears, does the involuntary or autonomic, aid the voluntary, particularly in those functions which are most youthful and which often cannot be carried out continuously alone without becoming a disturbing factor to consciousness, as suggested previously. Whether this is true in the visual system because of the immaturity of certain functions, or because the function we are now dealing with is *vital* to man as a distinct species, I do not know. Neither do I know if it is more true of the visual system than elsewhere in the body, but that seems to be a fact.

It is a fact that the visual system appears to be quite distinctive and to possess characteristics not so pronounced elsewhere. For example, its accommodative apparatus theoretically is entirely involuntary. The ciliary muscle is non-striated and the cells from which its nerve arises—the Edinger-Westphal nucleus—are of the involuntary type. Yet physiologists (Gaskell and Burton-Opitz) doubt that it is purely involuntary. Gaskell says:

> "I do not think this muscular system ought to be included in either of the groups of involuntary muscles already considered. The marked medullation of the motor nerve and the striation of the fibers in birds place it in a separate category as something intermediate between unstriped and striated muscle."

Burton-Opitz remarks:

> It is also of interest to note that the activity of this center (third nucleus) is under the guidance of the will, and is, therefore, controlled by the cerebrum. This must seem peculiar, because the effector, the ciliary muscle, is composed of smooth muscle tissue. It must be admitted, however, that these reactions are usually preceded by visual sensations. In other words, most persons cannot effect these changes in the eyes unless guided by objects in space. This observation might lead us to suppose that the act of accommodation is a simple reflex just because the motor actions upon which it is based seem to necessitate certain sensory impressions. In reality this is not true because we can easily learn to accommodate without first directing our eyes to near and far objects by simply making volitional efforts in a dark room, or after our eyes have been shaded. Under ordinary conditions, therefore, the

> process of accommodation belongs to the group of psychical or association reflexes. As such it occupies a position intermediate between the voluntary responses effected by means of striated muscle, and the perfectly involuntary reactions accomplished with the help of smooth muscle."

Apparently he bases this observation concerning the innervation of the ciliary upon the older idea that the origin of the ciliary fibers is the mesial portion of the third nucleus, whereas later investigations attribute this origin to the Edinger-Westphal cells. This newer understanding signifies involuntary influence rather than cerebral control, or "guidance of the will."

But still later consideration of the subject has led to the conclusion that the mesial cells (Perlia's nucleus) are the source of the convergence function, thus being regarded by Duke-Elder and others as a somewhat separate entity. Since stimulation of convergence eventually drags in accommodative activity, it is plausible to suspect that Perlia's nucleus exercises some control over the E. W. nucleus. That means an element of voluntary control, directly or by association, over the ciliary as well as over the internal recti. This helps to explain why conflicting phenomena occur.

Probably this is all, therefore, explainable on the basis that the voluntary and involuntary elements in the third nucleus are so closely associated that there is an actual anatomical connection between them, and the one influences the other. This apparently is borne out by the seeming effect of accommodation upon convergence and the effect of convergence upon accommodation.

But in the present instance we are interested in the extrinsic muscles of the eyes which are commonly regarded as purely voluntary. At will we can use these muscles to turn the eyes in any direction, and so the term "voluntary" is quite appropriate.

But somewhat recent investigations throw some doubt upon their being *solely* voluntary. Both laboratory and clinical experience tend to indicate that in the extrinsic eye muscles especially there is an involuntary factor of great importance.

With regard to the first, the following quotation from Evans (page 228, pub. 1928), is offered:

> "Suggestions that the muscular structures concerned in tonus are not the same as those used in ordinary contraction fall into two categories. One view is that the sarcoplasm of the muscles fiber is concerned with tonus, and the fibrillae with rapid contraction, the same fiber being thus capable of both types of action. The other view, which has recently been advocated by Hunter, is that there are two kinds of fibers in skeletal muscle, the one a red fiber of small thickness, rich in sarcoplasm, and capable of tonic contraction, the other an ordinary muscle fiber which executes the usual contractions.

According to this view, the muscle is brought by means of the ordinary muscle fibers to the position it is to occupy and then fixed in that position by means of the fine fibers, which enter into a state of tonic contraction of sufficient power to fix the muscle. According to this hypothesis the skeletal muscles of vertebrates resemble the muscles of invertebrates in consisting of two kinds of tissue: contractile muscles and tonus muscles. In an oyster, for instance, the shell is closed by the rapid contraction of the striated part of the adductor muscle, but kept in the closed state by the tonic contraction of another part of the adductor which consists of plain muscle. In the skeletal muscle of vertebrates, according to Hunter, both the contractor and the tonus muscles are striated, though exhibiting difference in minute structure.

"The view that the innervation concerned with the maintenance of the tonic state is different from that which is concerned with the contraction began with the demonstration in 1913 by Boeke that skeletal muscle fibers have a double nerve supply, viz., an ordinary motor supply from the medullated fibers of the anterior roots and a sympathetic post-ganglionic supply consisting of non-medullated fibers which have entered the anterior root by the grey rami communications. Since then a number of observers, commencing with de Boer in 1913, have claimed that postural tonus is dependent upon the sympathetic nerve supply.

"The double innervation of striated muscles must be accepted as proved."

The accompanying illustration is offered by Woolard as evidence of this double nerve supply (page No. 187, 1927). We quote as follows from his work:

"We might briefly refer to the supposed double innervation of striped muscle, since the sympathetic supply to muscle has been supposed to be the efferent channel of postural tone. We will refer only to the morphological aspect of the question. This aspect of the question still remains on an insecure basis, and the interpretations given by various investigators are contradictory. Boeke—and his work is confirmed by the investigations of Agduhr—believes that each muscle fiber, in addition to being innervated by a cerebro-spinal fiber, receives an additional accessory ending from the sympathetic. These results have been obtained in normal and experimental preparations. A different view has been derived from the work of Kulsckitsky. According to this view, there is a double innervation of striated muscle, but in this case the two systems of nerves innervate separate muscle fibers. The two kinds of muscle fibers are distinguished as thick and thin, the former receiving

the cerebrospinal fiber and the latter the sympathetic fiber. A third group of investigators is unable to accept either view, and for various reasons doubt the double innervation of muscle. Da Castro, as the result of his experimental investigations, has been unable to confirm the findings of Boeke. Da Castro, Bielschowsky, and others, though unable to confirm the double innervation of the somatic muscles generally, yet find that

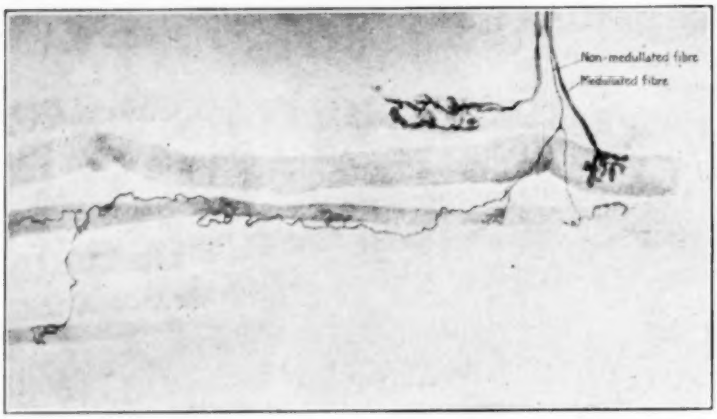

Figure 27. Methylene blue preparation of the superior rectus of the rabbit showing the two types of nerve and muscle fibers. The preparation was from a normal rabbit, and the non-medullated fiber may be of sympathetic origin. (Woolard. Recent Advances in Anatomy.)

the ocular muscles behave in an anomalous fashion. Woolard has investigated this question in normal and experimental animals and has been unable to find a double innervation of the somatic limb muscles, for instance, but finds that the eye muscles behave differently from the rest. If his interpretation is correct, and this in the eye muscles is based on normal and not experimental material, then a double innervation of the eye muscles occurs. The cerebrospinal and the sympathetic fiber are not, however, distributed to the same muscle fiber, but to two different kinds of muscle fiber. In fact, the distribution of the two kinds of nerve fibers in the ocular muscles agrees with the Kulschitsky and not with the Boeke conception."

Of course this material just offered has to do largely with tonus contraction but it serves to corroborate the hypothesis we are offering. While

it seems to be true that hypertonus of what might be termed an ordinary type can exist for considerable time without perceptible fatigue, it is difficult to believe that excessive tention in so important a segment of the nervous system as the visual system can exist for years without deleterious results.

On the clinical side we have evidence, as will be demonstrated in the presentation of case reports, that the converging muscles are subject to long-sustained contraction which apparently can be maintained only on the basis that there is involuntary stimulus in excess of normal tonus requirements. When, in case after case, which first evidenced approximate orthophoria and normal abduction, it is found that consultants can wear continually, with comfort, prisms base-in to the extent of from 2 to 9 P. D. and subsequently reveal a like degree of exophoria and a consistent amount of abduction, that is, from 8 to 16 P. D., it is logical to believe that the exophoria existed all the time and was merely concealed by an extraordinary tension of the converging muscles.

When, at the same time, these consultants have found relief from excessive symptoms such as constant headache, extreme nervousness, deranged digestion, and other conditions as bad or worse, it is likewise logical to assume that the apparent strain we relieved was the cause of these neuroses.

It is believed that the foregoing explains why a high percentage of our cases possess what may be termed "latent exophoria" and why and how the involuntary system is called upon to overcome the condition.

Summarizing the foregoing, we briefly state our case as follows: In his progress from lowest form of life, Man accumulated many organs and functions. Some have been discarded, others have declined in usefulness and still others have been greatly transformed and elaborated. From neither the biologic nor the utilitarian standpoint—the ontogenetic nor the phylogenetic—can all of the latter, or perhaps *any* of the latter, be considered to have reached a state of perfection.

The visual system is no exception. From all the evidence at hand it seems to be perfectly logical to believe that Man's present visual system represents the last, but not necessarily the final, stage in a long series of steps upward. Its parallelizing and converging features being its latest acquisitions, it is natural that in many people these are incompletely developed.[1] Since nature steadily strives to reach her goal, and since her goal

[1]This so-called "under development" seems to be proven by the fact that it exists in at least 30 per cent of office practice cases, whereas the contrary condition (over-convergence) exists in only about 6 per cent of such cases, and of these the great majority are believed to be pseudo, that is, the over convergence is only temporary, is due to strain, and therefore does not represent the true anatomical condition. On the other hand, the percentage given for exophoria is conservatively low, Marlowe having found it to be about 37 per cent before his occlusion test and about 77 per cent after the occlusion test. His esophoria cases declined from 20 per cent to 8 per cent under occlusion. His method is essentially designed to induce a position of natural rest. It is believed that most of the exophoria conditions represent true anatomical conditions and that when they disappear as a result of base-out treatments they are merely concealed by tension of converging muscles.

in man seems to be his attainment of a superlatively high degree of intellect relative to other animals, it is logical to assume that all resources will be utilized to achieve the desired end. The most important tool at her command is stereoscopic vision, resulting from binocular single vision. Even if the mechanism for creating stereoscopic vision is imperfect or handicapped, it *must* be used, for, as before stated and as again emphasized, stereopsis is a function vital to Man's position as a distinct species.

Obviously, this mechanism consists of the converging apparatus. For the sake of brevity we can say that normally it does not begin to function until it becomes desirable to view objects closer than infinity. Then the muscles voluntarily turn the eyes inward toward each other.

But in the cases under consideration, when the visual axes in a pair of eyes *at rest* are divergent, it must begin to function before parallelism is achieved. Furthermore, it must take up this "slack" in the static adjustment of the eyes and hold them relatively parallel continuously so that stereopsis is instantly available at all times.

Because excessive use of the voluntary system would defeat nature's purpose by arousing such unpleasant symptoms that close application would be avoided and mental development retarded, we assume that the involuntary reserves are drawn upon. This is accomplished by augmented nerve energy flow to the tonus mechanism of the converging system—a function of the autonomic or vital system of nerves.

This forced augmented "hook-up" of the extrinsic eye muscles with the vital system, which is in operation constantly, simply means that the eye muscles are in a constant state of tetanus and are drawing energy from the rest of the body system for twenty-four hours a day. For a few days or weeks or even months this might be borne without evil results, but when it goes on for years, there is so great a depletion of energy that general breakdowns are not surprising.

It must be evident that a visual system in this condition cannot be considered to be *at rest*. Indeed, it is subject to that form of strain which ultimately brings about the most profound depletion of energy, resulting in such extreme symptoms as general exhaustion, chronic indigestion, abdominal pains, frequent or almost continual headache, especially in the occipital or cerebellar region, despondency, ill-temper, intolerance of any form of close work.

The local symptoms range from none at all to blurred vision (remedied either with prisms base-in or minus lenses), itching and burning of the lids, photophobia, supra-orbital, intra-orbital and apparently intra-ocular pains which may be slight or severe, intolerance of motion pictures or sustained close work. Pains in neck, shoulders, arms and back are not uncommon.

Those afflicted sometimes undergo operations, rest cures, dieting, change of occupation and frequent change of glasses and so on without experiencing more the partial or temporary relief.

Associated with this form of latent exophoria we commonly find latent hyperopia, or myopia of a higher degree than would otherwise exist. Either condition arises from the same cause—apparently an overstimulus of the ciliary muscle due to the close association of the converging centers with the accommodation centers. We are not prepared to say whether that occurs wholly in the third nucleus where at least some of the cells involved in the two functions are closely associated anatomically or whether it is a reflex to the accommodation system from that part of the autonomic system which is connected directly with the converging muscles. It is an incontrovertable fact that relaxation of the converging muscles by means of prisms base-in often relaxes the ciliary muscle, with the result that the refraction of the eye declines in power. This can be demonstrated objectively with the skiascope and subjectively by normal acuity with higher power plus or lower power minus lenses.

It must be evident also that any attempt to relieve such eyes of strain by common orthodox methods will be defeated if the basic cause is not attacked and eliminated. The primary reason for giving most lenses, outside of improving acuity, is to relieve abnormal tension. The finest and most careful refraction it is possible to make is inadequate or utterly futile if the refractive system to be measured is held in a position of suspense by influences foreign to the desire for clear vision. It would be like trying to arrive at the true length of a rubber band while the band is stretched.

In some cases this tension is easily discovered. In others it comes to light only after patient trial and experimental work. Not often can its full extent be determined immediately. It cannot be expected that the flow of nervous energy to and from millions of cells can be readjusted either quickly or comfortably or fully in a few hours or days. Sometimes months elapse before perfect harmony is achieved.

Nerve and muscle cells can be likened to so many electric batteries and motors. When a particular movement of a part of the body is desired, nerve cells discharge energy, presumably electrical, into the muscle. This contracts in response thereto. When this movement is a new one, the amount of energy and the number of cells and fibers to be used is experimentally determined by the brain. If the movement is repeated frequently, there is a more or less definite group of cells and fibers employed each time—it varies relatively little. Repetition renders the action somewhat mechanical and constitutes the basis of *habit*.

It is somewhat like pushing an electric button which turns on certain light bulbs which spell a certain word. When that word is wanted, the same button is always used, and the same bulb receives the electrical impulse and the same word appears. The whole mechanism—button, bulbs, wires—can be called a pattern.

Nerve and muscle cells and fibers used in a given act also are termed a "pattern." But there are countless numbers of such patterns in the human body, many of which are intimately connected together so that

when one is stimulated into action, they all respond to a greater or lesser degree. Any change in the dominant pattern requires a change in all the rest.

Probably no part has so many patterns linked together with it as the visual system. As previous remarks indicate, it occupies a dominant position over enormous sections of the nervous system. These are all adjusted to respond somewhat harmoniously, instantaneously and simultaneously to the commands of the master organism.

As the result of millions of acts extending sometimes over many years, the visual system has established a multitude of patterns, each one constituting a habit. Linked with each one of these there are a vast number of patterns in other parts of the body. They all act mechanically together—they "mesh" in together like the wheels in a tremendously complicated machine.

When lenses, and especially prisms, are placed in front of the eyes, the relationships of great numbers of these patterns must be altered. The connection between groups of cells must be readjusted, there must be a reapportionment of energy flow to each part. It is an intricate process, requiring time and patience.

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THE LEV-L-ENZ, AN INSTRUMENT TO ASSIST IN SECURING THE PROPER ADJUSTMENT OF BIFOCAL LENSES*

F. McFadden, Opt.D.
Rutland, Vermont

The LEV-L-ENZ is an instrument with which to quickly and accurately level bifocals. Little instruction is required in its operation.

Ordinary lenses are quite easily adjusted to a level position by mere inspection, but bifocals require more attention to detail. Since the margin is not readily seen by the adjuster, he often judges by the edge of the frame against the eyebrow or the face, or depends upon an intuitive sense of horizontal. But since the pupils of many eyes are not on a precisely horizontal line, sometimes varying from it a millimeter or two, this method is not practical.

Many people normally incline their heads, for one cause or another, and this habit makes leveling by our sense also impractical. When the eyes move across the field of bifocal lenses, from distant to near vision, and the reverse, they should cross the division line at precisely the same time. In case they do not, one eye will be seeing through the distance lens, the other through the segment, and for an instant there must be disturbance even to the point of diplopia. In any event, there is shock to the optical system of the eyes.

If there is a considerable variation there is a consequent artificial hyperphoria, sometimes highly aggravated, and if mis-balanced bifocals of any considerable degree are worn for a time this error becomes quite fixed and persistent.

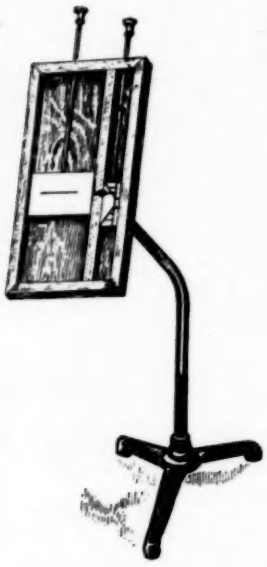
Leveling bifocals, so that each pupil encounters the junction line at precisely the same instant, and transition takes place concomitantly, is essential to their satisfactory use, and to our prestige.

In using the instrument, one seats the patient preferably in the operating chair, where they may easily be raised to a proper position.

Cover one eye, and direct them to look closely at the dot in the center of the line on the large block.

Instruct them to assume a normal, comfortable, natural position, after which they are to "freze," sitting immovably.

*Submitted for publication July 12, 1933.



Mc Fadden—Figure 1. The LEV-L-ENZ

Now raise or lower the block until they see two lines instead of one. Preferably these lines should appear about equal in density, or blackness, or width, but need not necessarily be exactly alike.

The position found for doubling of the line before one eye having been ascertained, we slide the index until the arrow points midway.

The cover is now transferred to the other eye, the patient being at the same time cautioned to hold their head rigidly. Should they now say they see only one line, we raise or lower its block until two lines are again observed.

Looking upon the index scale, it will now indicate whether to "drop the right lens—which raises the left," or to "drop the left lens—which raises the right."

The usual bending of joints or temples is now carried out, after which they are again checked. Usually two or three tests will bring the lenses to a perfect level, requiring only a few moments of time.

It is always well, before beginning adjustment of lenses in frames which have been used a long time, to properly tighten the joints with lens washers, or any other means, taking out the wabble.

After the adjustment has been completed, hand the patient some reading matter, and briefly tell what has now been done, and how much more comfortable their eyes will now feel.

The LEV-L-ENZ is a new piece of apparatus designed especially for the quick and accurate adjustment of bifocals. Its appearance is impressive, and is slightly mystifying to the patient, since they cannot quite understand why one line should look like two before each eye, after which their lenses are so much more comfortable than ever before.

The adjuster should take a moment to explain the advantage of keeping their lenses in accurate adjustment, and advise them to call at regular intervals for this service.

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THE VISUAL SYMPTOMS OF INFLUENZA

As refractionists, we observe from time to time, patients whose refractive condition seems to change materially after an attack of influenza. Either they seemingly need an increase of plus to give them comfort at the near-point or in patients who have never used a correction, they seek the services of an optometrist because of difficulties encountered at the reading distance.

It is also observed that it is not so much because a person cannot read at all, but rather because this reading effort cannot be maintained with comfort for any reasonable length of time. This is the usual symptom with these patients and it is likewise observed that in these cases they but rarely regain their ability to do near-point work with comfort without first using a correction of some sort, or an increased correction for a variable period of from six months to a year.

Of course the word "influenza" or what is more commonly called "flu" has become a very loosely used term and is often applied to conditions not truly indicated by that name. In cases of this sort, naturally, the ocular symptoms may not be as severe. However, in true cases of influenza, these ocular symptoms are nearly always present and the reason for this is obvious when the results of this bacteriological disease are studied.

True influenza is caused by the bacillus named after the German scientist Pfeiffer and is called Bacillus Influenzae Pfeiffer. It is spread by infection and contagion and contracted through the respiratory organs. The first symptoms are, as a rule, of a catarrhal or bronchial nature with possibly some gastric complications on the side, these followed by a period of fever with rather high temperatures. In most cases the onset is marked by a condition of general prostration. Various muscles of the body ache and loose their tone and there is a marked loss of power of the entire motor system. Obviously the muscles of the eyes share in this upset condition, patients complaining of a pain in and around their eyes, an intolerance of light, diplopia, and a disinclination to concentrate on any nearby object.

As these general symptoms of influenza subside they are followed by a period of convalescence, the principle feature of which seems to be a condition of general weakness, especially one of muscular weakness evidencing a diminished motive power. These symptoms persist for some time and the eyes as a rule share fully in the apparent weakness. Some ocular relief can be given by temporary treatment corrections to be used until nature has restored the old normal balances of the motor centers.

C. C. K.

* * * * *

EPIDEMIC OF ENCEPHALITIS IN ST. LOUIS

It is interesting to note that the usual visual symptoms of encephalitis, namely, diplopia and a severe ptosis of the lids, are absent in the recent epidemic of this disease which was prevalent in and around St. Louis, Missouri, during the late summer and early fall of this year.

Reports from St. Louis indicate that the onset of the disease is typical, with the usual headache, nausea, fever, stiffness of the neck and mild inflammation of the pharynx. This is, in most cases accompanied by a fine tremor of hands and tongue. There is a certain amount of stupor and coma coupled with mental confusion and aphasia. The unusual observation, however, is the almost complete absence of ptosis of the lids and double vision.

Leake[1] finds that this epidemic differs from most other outbreaks in that ophthalmoplegia, ptosis and strabismus are much more uncommon, while demonstrable meningeal involvement is practically uniform in the recognizable cases; as observed thus far, recovery has been more often prompt and complete. The onset is usually fairly sudden, that is, not prolonged over more than three days to reach a definite development, with general malaise and a febrile disturbance, often with a headache. Vomiting and other gastro-intestinal symptoms are not uncommon. Evidence of cerebral involvement may be the first indication of the

[1]J. P. Leake. Encephalitis in St. Louis. Jour. of the American Medical Assn. Sept. 16th. 1933. p. 928.

disease. Pronounced somnolence is not the rule; the patients are apathetic, mentally and physically sluggish, stuporous or comatose rather than somnolent; they may be delirious enough to require restraint but are not noisy. The neck becomes slightly or moderately stiff at some stage in the well developed disease, and the cells in the spinal fluid are above normal in number, rarely exceeding a few hundred, chiefly lymphocytic. The lumbar puncture often relieves the headache permanently. With the fever there is usually a moderate leukocytosis. He also finds that some of the chief reflexes and the superficial reflexes, such as the abdominal, are absent and vary from day to day. C. C. K.

* * * * *

PHOTOGRAPHS OF EYE MOVEMENTS

In the intricate study of the minute movements of the eye while reading the camera has proved to be of great value, as photographs can now be taken showing all eye movements both in the horizontal and vertical plane. The procedure is as follows. The patient under test is seated before a specially designed camera. His head is fixed in a head rest and the material to be read is placed on an illuminated plate immediately below the camera lens. From the side of the subject a beam of light from a six-volt ribbon filament lamp is reflected first to the cornea of the eye from silvered glass mirrors and then from the cornea through the camera lens to a moving kinematograph film. The position of the corneal image on the film changes with each movement of the eyes. While the subject reads, a photograph is made which records the horizontal movements of the eyes as a sharply focused line upon the film.

An electrically driven tuning fork is mounted in the path of the light beam in such a manner that it intercepts the beam twenty-five times a second. These vibrations produce on the film a series of dots rather than a solid line, each dot representing exactly one twenty-fifth of a second. The movement of the photographic film is vertical and continuous, and the record shows a vertical line of dots when the eye is fixated in a single position and a short horizontal line when the eye is in motion in a horizontal or oblique direction. Reflection from a bright nickel-plated bead fastened to a pair of spectacle rims worn by the subject makes a second line upon the film which furnishes an index of head movement and gives a constant point of reference for plotting the film.

Vertical movements of the eyes can also be recorded on a horizontal film in this apparatus, and by synchronising the two separate films a record may be obtained showing movements of the eyes in both planes at the same time. C. C. K.

PSYCHOTHERAPY AND REFRACTION

It is an accepted fact that under certain conditions a man's subconscious mind can be made to influence his bodily functions to the extent of stimulating organic disease or at least disorder. This being true, however, it is also a known fact that the subconscious mind can also be affected favorably, the process, therefore, being reversed with the result that a harmonious working relationship of physical processes be again established. This latter act is, in fact, the practice of psychotherapy and is used to a greater or less degree in the practice of any of the healing arts.

As optometrists it is necessary from time to time to relieve the symptoms of some neurotic individual, for us to resort, to psychotherapeutic measures. As a guide to the possible application of these methods Hayes-Towns[1] finds that a lack of consistency in symptoms, such as their appearance only under conditions which are repugnant, and their failure to appear in more enjoyable conditions, may indicate the true cause of the trouble. In such cases severe headache may manifest itself during workaday conditions, ceasing at evening, and never appearing during the week-end when close work of an acceptable nature is indulged in. The neurathenic may also be known by his morbid approach to symptoms and the evidence of dangerously little technical knowledge. In such cases there will be a failure to relieve the symptoms unless the correction or the treatment prescribed is felt by the patient to be adequate. Neurasthenia is suspect in the absence of any defractive or muscular cause for the asthenopia (though the examination must be full and comprehensive here), and in the absence of any organic lesion likely to produce such symptoms.

The treatment in these cases consists of conscious and unconscious suggestion used, frequently simultaneously. To diagnose the element of suggestion in any case is to indicate the lines on which relief can be given. The bad suggestion can be uprooted by well-directed counter-suggestion, these psychotherapeutic technics frequently proving themselves to be of great value.

C. C. K.

BOOK NOTICES

THE APE AND THE CHILD, by W. N. and L. A. Kellogg. Published by the Whittlesey House McGraw Hill Publishing Company. New York, N. Y. 341 pages, 20 figures and numerous photographs. Cloth binding, $3.00, 1933.

This book, "The Ape and the Child," is the result of a very interesting experiment the Kelloggs carried out to determine the effect of environment upon normal development and behavior; to what extent

[1]F. G. Hayes-Towns. Suggestion in Refraction. The Australasian Jour. of Optometry. Vol. 15, No. 7, pp. 24-32. 1932.

would an animal acquire human traits if placed in a human environment.

As subjects for this experiment they have used Donald, their only child, who was 10 months old at the beginning of the experiment, and an antrapoid ape, Gua, who was 7½ months old. Both the ape and the child were kept under the same environmental influence and were given the same care, attention and experimental tests. It was found that the ape during the period of the experiment developed a number of human characteristics such as walking upright, eating from dishes with a spoon, drinking from a glass, understanding many things when spoken to and performing many activities even better than the child. In very many respects the ape behaved like a child, this is claimed to be due to the human influences. It was also found that in many instances the ape learned at a faster rate than the child.

The authors conclude from this experiment "that the child and the ape acquire a great deal of new behavior which is the same." They account for such like characteristics on the part of the subject by stating:

(1) "That the heredities of the two are similar enough in these particular respects to permit similar reaction to the same stimuli," and (2) "That the environment is the actuating factor in bringing out the potentialities of the subject for similar development."

In writing this book the Kelloggs have contributed to our knowledge about inherited and acquired characteristics. They have used simple language, so that even the layman, without a knowledge of psychology, can understand their work. J. I. K.

ANNOTATIONS
AND
SOCIETY PROCEEDINGS

The American Journal of Optometry is the Official Organ of the American Academy of Optometry, as well as the Organ of the Arkansas, Delaware, Indiana, Iowa, Maine, Maryland, Michigan, Minnesota, Nebraska, North Dakota, Oklahoma, Pennsylvania, South Dakota, Vermont and West Virginia Optometric Associations.

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DR. J. F. ANDREAE
Baltimore, Md.
DR. O. E. BELL
Fairmont, W. Va.
DR. R. G. COLBERG
Aberdeen, S. D.
DR. C. H. DEGRAFF
Monroe, Mich.
DR. L. P. FOLSOM
South Royalton, Vt.
DR. F. W. FREEMAN
Anderson, Ind.
DR. A. J. LARGE
Winona, Minn.
DR. J. J. LIVINGSTON
Little Rock, Ark.
DR. M. B. MEYER
Wilmington, Del.
DR. J. K. MORRIS
Erie, Penn.
DR. C. A. PERRIGO
Norfolk, Neb.
DR. D. E. PLAISTED
Lewiston, Me.
DR. H. R. SPITLER
Eaton, Ohio
DR. A. P. WHEELOCK
Des Moines, Ia.

OKLAHOMA STATE CLINIC

Oklahoma Optometrists from all parts of the state convened at Oklahoma City October 18th, 19th, and 20th for the ninth annual post-graduate clinic, held under the auspices of the Oklahoma Association of Optometrists.

The chief instructor and lecturer was Dr. A. M. Skeffington, director of the Graduate Clinic Foundation, assisted by Dr. R. A. Dieman, president of the State Association; Dr. H. D. Brewer, chairman of the Central District; Dr. V. E. Bowers, acting secretary of the State Association; and Dr. W. S. Farmer, chairman of the Department of Education.

The afternon and evening of the 18th and the morning of the 19th were devoted to lectures and demonstrations. At noon of the 19th, Dr. Skeffington addressed the Oklahoma City Kiwanis Club on the subject of "The Under-privilegd and Handicapped Child." The address was broadcast over radio station KOMA. A good number of the officials and directors of the State Association were present as guests of Kiwanian Dr. Farmer. The writer has heard Dr. Skeffington speak on many occasions and before different groups, clubs, etc.; but from the response and comments of both optometrists and club members, we believe this was one of the most effective messages it has been our privilege to hear on behalf of optometry.

Thursday's clinic session was adjourned at 5:00 P. M. That evening Dr. H. D. Brewer, chairman of the Central District, together with the members of the Ladies Auxiliary, honored Dr. Skeffington with a reception in the home of Dr. and Mrs. W. S. Farmer. Those in the receiving line were: Dr. R. A. Dieman, Okmulgee; Dr. Brewer; Mrs. Farmer, president of the State Auxiliary; Mrs. A. R. Zellers, Kingfisher, secretary-treasurer of the State Auxiliary; and Mrs. W. I. Davis, Wewoka, president of the Central District Auxiliary. This was one of the most successful social entertainments in the history of the State Auxiliary. Seventy-three optometrists, their wives, and friends were present.

At the beginning of the clinic session Friday morning, Dr. Skeffington was requested to devote an hour discussing the N.R.A. as it pertains to optometry. He stressed very vividly the tremendous importance of an increased membership of those eligible in the State Association, and the importance of a more unified action on the part of all members. He also explained some of the standards set by the N.R.A. and the requirements necessary to avoid violations. The lectures were continued throughout Friday with the lecturer going deeply into the neurological and physiological ocular disturbances and their correction.

The state officials, the board of directors, and chairmen of departments held a business session Friday from 11:00 A. M. until 6:00 P. M. where many vital problems and plans were worked out for the future welfare of optometry in Oklahoma.

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WESTCHESTER COUNTY SOCIETY

The regular monthly meeting of the Westchester County Optometric Society was held Thursday evening, October 19th, at the Roger Smith Hotel, White Plains, N. Y.

Prof. E. M. Kelly gave a lengthy discourse on Problems of Orthoptic Training.

President Julius Feinberg appointed the nominating committee for the officers of 1934.

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ANTHRACITE OPTOMETRIC ASSOCIATION

Dr. M. L. Blum of Hazleton, secretary of the Anthracite Optometric Association, has sent the following intersting news item:

A regular meeting of the Anthracite Optometric Association of Pennsylvania was held in the office of Dr. H. E. Harris, Shamokin, president of the society. On this occasion Dr. J. C. Strauss, Allentown, Pa., president of the Pennsylvania Optometric Association, addressed the members on the various important phases pertaining to professional optometry that were acted upon at the National Optometric Convention of the A.O.A. held in Chicago.

The Anthracite Optometric Association of Pennsylvania meets monthly in the different towns which lie in the area of the society.

MASSACHUSETTS BOARD OF REGISTRATION

The Massachusetts Board of Registration in Optometry will hold its next examination on November 27, 28, 29 and 30, 1933, at the State House, Boston, Massachusetts. Applications for examination should be on file at the office of the secretary, Room 141, State House, at least ten days before date of examination.

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SALEM OPTOMETRIC SOCIETY

A social meeting of the Ocular Science Research Group was held Wednesday, October 18th. The Graduate Clinic Extension material on "Correction of Working Point Fatigue" was covered.

In addition to the Salem Optometrists attending were Dr. Sam Tyler of Eugene and Dr. O. A. Kreamer of Independence.

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ESSEX COUNTY SOCIETY

The September meeting of the Essex County Optometric Society, was held Friday evening, October 6th, at 28 James Street, Newark, N. J. President, Dr. B. I. Sinoway; vice president, Dr. H. Leslie Salov; treasurer, Dr. Harry Martin; secretary, Dr. Joseph H. Salov, and of the executive board: Drs. Walter G. Oelschlaeger, Irwin R. Silvers, Charles E. Jaeckle, John A. Steeve, and Harry Kaplan.

The minutes of the June meeting were called for, read, and accepted without corrections. The chairman called for the minutes of all the Executive Board meetings that were held during the summer, and same were accepted as read.

President Sinoway now gave the floor to the Educational Committee and Dr. Charles Jaeckle, explained how the clinic staff of the Free Optometric Clinic, was endeavoring to continue a series of talks and demonstrations on an important phase of optometric work, and that the present talk was a second in this series. The subject taken up was "Types and Causes of Convergence Anomolies." He was assisted by Dr. H. Leslie Salov and Dr. Fred W. Hanle. A most interesting session was spent, followed by a discussion by those present.

Dr. Joseph H. Salov, now introduced Dr. Charles Jacknowitz, inspector for the New Jersey Board of Optometry, and one of its mem bers, as the guest speaker of the evening. Dr. Jacknowitz, gave a most interesting talk on the work of his department, and what it has accomplished, showing that the state of New Jersey, is one of the cleanest states in the whole union, regarding illegal practices, and misrepresentative advertising. He proved with facts and figures how the Board of Optometry has cleaned up the advertising pages of the newspapers, and the window displays for some of those who were slow in following the

recommendations of the board. He finished his talk with a plea for 100 per cent co-operation, and an increase of membership in the State Association. He pointed out, how now more than ever, there exists the absolute necessity to join the ranks of organized optometry, to get the proper recognition from the Federal Government. A rising vote of thanks was extended to the visitor.

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ILLINOIS OPTOMETRIC SOCIETY

The meeting of the Executive Council of the Illinois State Society of Optometrists was called to order by the chairman, Dr. B. V. Schoenborn, of Chicago, the following being present: Drs. William B. Irvine and Charles Lens, Springfield; Dr. George McGraham, Dixon; Dr. Frederick Litsinger, Oak Park; Dr. John DeMoure, Peoria; Dr. B. R. Krieg, Kewaunee; Dr. C. Wallace Duncan, Rockford; Dr. J. Frank Wallace, Decatur; Dr. Roy I. Pettit, Champaign; Dr. J. W. Barrett, Freeport; and Drs. H. E. Pine, Otto Bersch, Otto Engelmann, P. W. Peterson, V. B. Dixson, H. C. Paul, Simon Feinstein and George A. Rose, of Chicago.

Drs. William B. Irvine and Charles Lens, who had been appointed on Resolutions Committee, submitted the following with suggestion that it be adopted until the code submitted to Washington has been accepted.

RESOLUTION ADOPTED BY THE ILLINOIS STATE SOCIETY OF OPTOMETRISTS AS A TENTATIVE CODE PENDING THE ACCEPTANCE OF A CODE BY THE GOVERNMENT

WHEREAS, our President and the Congress of the United States have by appropriate legislation set into motion, the machinery for the mobilization of all legitimate business in a patriotic effort to lift this nation out of the greatest depression the world has ever known; and,

WHEREAS, the optometrists of the nation desire to cooperate to the fullest extent in this gigantic program, and in so doing are willing, if necessary, to assume grave and additional responsibilities; and,

WHEREAS, the profession of optometry, realizing the importance of its service to mankind, has endeavored to, and has succeeded in raising the standards and requirements of the profession, but notwithstanding such accomplishments, is cognizant of certain unethical and misleading practices of some within the profession, whereby the general public, and especially the poorer classes, are importuned and induced to visit and receive treatment of certain individuals, who, through the medium of newspaper advertising, represent that the treatment of the eyes can be successfully obtained at a very small price; and,

WHEREAS, the profession of optometry and the general public have both suffered by reason of lax regulations governing the treatment of the eyes and the furnishing of eye-glasses, and the ability of certain individuals to gain the confidence of the public through the medium of advertising; and,

WHEREAS, the personal examination of the eyes of a patient by a recognized specialist, viz., optometrist or ophthalmologist, is recognized as a pre-requisite to the proper fitting of eye-glasses, and that to permit self-examination by a patient of his own eyes by any appliance or device, is contrary to the public welfare, in that there may follow as a result thereof, permanent and impaired vision, and possible blindness; and,

WHEREAS, in and by the Code adopted by the optometrists of this nation, the dispensing of eye-glasses or other optical appliances, either personally, by mail, or by any other method of delivery to a person who has examined his own eyes, or when the prescription of his optical deficiencies has not been determined by a licensed or registered optometrist or physician, has been condemned and declared to be unfair practice and is prohibited; and,

WHEREAS, such code has been adopted as a part of the program of our Government as hereinabove recited; and, whereas, it is the candid opinion of the optometrists, that the accepting of advertising from certain individuals and organizations by the newspapers, wherein the general public, and especially the poorer people, are deceived and misled into receiving inadequate and improper examinations, resulting in poorly fitted glasses, with serious consequences, is merely aiding and assisting these improper practices, and is not in harmony with the plans and purposes of the Government in marshalling the business to the call of our Government;

NOW, THEREFORE, BE IT RESOLVED, that the accepting by the newspapers of America of advertising from individuals or concerns who appeal to the general public in the manner herein described and suggested, be and the same is hereby condemned; and

BE IT FURTHER RESOLVED, that a copy of this resolution be forwarded to the President of the United States, and to the proper representatives of the newspaper organizations who are in a position to prevent the acceptance of this character of advertising; and,

BE IT FURTHER RESOLVED, that we commend the "Better Business Bureau" of the City of Chicago, for its untiring efforts and results obtained in its attack against such character of advertising.

DR. GEORGE A. ROSE,
Department of Public Information,
Illinois State Society of Optometrists.

Who Remembers